

## REMARKS

### Pending Claims

Claims 1-16 are pending in this application. Claims 1, 8, and 13 have been amended to further define and describe the invention. No new matter is added by way of any of these amendments. Reconsideration is respectfully requested in view of the amendments and the remarks herein.

### Claim Rejections

The Office Action mailed July 31, 2003 rejected claims 1 to 3, 8, 12 and 13 under 35 U.S.C. § 102(e) as anticipated by Park (U.S. Patent 6,408,175), and claims 4-6, 9-11, and 14-16 as under 35 U.S.C. § 103(a) as obvious over Park in view of Harris (U.S. Patent 6,442,406) and as obvious over Park in view of Blanke (U.S. Publication 20010046850). Independent claims 1, 8 and 13 have been amended herein to clarify the nature of the present invention.

In understanding the nature of the invention, a bit of background would be of assistance. In the embodiments described in the present specification, mobile user equipment, such as a cellular telephone, has a subscription with a "home operator." Typically, that home operator might have its own cellular network that it operates in a particular geographical area (for example, a particular country or state). The mobile user equipment will usually be operated in the home network of the home operator, and the home operator will levy appropriate charges to the subscriber.

However, the mobile user equipment may also be operated outside the home network in a visited or "serving network." There will typically be a "roaming" agreement between the home operator and the serving network which allows the mobile user equipment to operate within the serving network and for charges for the use of that serving network being made by virtue of the subscription of the mobile user equipment to the home operator. Details of calls made in the serving network will be passed to the home operator. The home operator will make a payment to the serving network for the call services provided and will re-charge those costs to the owner of mobile user equipment, together with its own charges.

When the mobile user equipment is present in the home network, the home network has full control over the procedure to authenticate the mobile user equipment with the home network. A direct exchange of data can take place between the home operator and the mobile user equipment. However, when the mobile user equipment is operated in a serving network, the home network cannot communicate directly with the mobile user equipment, and must rely on the serving network to communicate with the mobile user equipment. It may be difficult for the home operator to ensure that correct authentication procedures are carried out by the serving network.

To allow authentication of the mobile user equipment, the home network generates an authentication vector. When the mobile user equipment is roaming in the serving network an authentication vector may be requested by the serving network issuing an "authentication data request." The authentication vector is then passed from the home operator to the serving network and includes various parameters. A subset of these parameters (RAND and AUTN) is passed to the mobile user equipment. These parameters are then processed by the mobile user equipment. The mobile user equipment generates various values based on the authentication vector (RES, IK and CK). The RES value is sent to the serving network, which responds with a key set identifier (KSI). The mobile user equipment passes the KSI value to the serving network with each request for service.

The user equipment may initiate calls via the serving network using the same KSI value without requiring a new authentication vector to be requested from the home operator by the serving network. This is undesirable in some circumstances, for example, where the home operator wishes to increase the level of security or control or monitor the level of use of services by the mobile user equipment (for example in accordance with its subscription status with the home operator).

As discussed in the present specification on page 3, one possibility for doing this would be for the serving network to be given instructions on how the authentication vector should be used. However, this would require the home operator to rely on the competence of the serving network to ensure that the instructions are correctly followed. Further, assuming that the instructions are passed electronically, new signalling messages would need to be standardised and new procedures in the serving network visitor location registers (VLRs) would need to be devised, standardised and implemented to ensure the VLRs respond

correctly to the new signalling messages. In a cellular communications system, standardisation between networks is highly advantageous, and any alteration to the structure of the signalling between the components of a telecommunications system is highly disadvantageous.

In accordance with an aspect of the present invention, the mobile user equipment is able to generate a termination message and pass this to the serving network, which message contains a value indicating that the serving network must obtain a further authentication vector from the home operator before allowing the mobile user equipment to make further calls. In the embodiments, this is achieved by the mobile user equipment issuing a KSI value which causes a new authentication vector to be requested from the home operator when service is next requested from the serving network.

In one embodiment, the effect of this is that an authentication vector is requested for every call made by the user equipment in the serving network. This ensures that the full authentication occurs for every call and also means that the home operator is notified of every call made by the user equipment. This means that the home operator has control over the security of the user of the user equipment in the serving network.

In an alternative embodiment, the user equipment can allow the authentication vector to be used for a predetermined time period, a predetermined number of calls or a predetermined total call duration (which may span more than one call).

It will be understood by those skilled in the art that the present invention allows the home operator to maintain control over authentication of the mobile user equipment when the mobile user equipment is operated in a serving network. Highly advantageously, this control is exercised without changing the signalling structure between the various components of a telecommunications system comprising the home operator, the serving network and the mobile user equipment.

Prior art reference Park describes a mobile communications system, and a method of managing "mobile station operational parameters" such that a mutual authentication between a mobile station and a network can be performed while maintaining the operating procedure of the mobile station operational parameters. This is done using over-the-air parameter administration (OTAPA) technology. This document is concerned with providing authentication between mobile user equipment and a home operator, rather than how a home

operator might control the authentication of mobile user equipment when that mobile user equipment is operated in a serving network. Park is concerned only with authentication of a mobile terminal with the home operator when that mobile terminal is operated in its home network. Park does refer, for example in Figure 3, to a "home system" comprising OTAF, HLR and AC; and a "serving system," comprising MSC and VLR. However, this terminology is used in Park simply to refer to different parts of a single home telecommunications network. For example, the elements of the "home system" might be provided in a centralised location, whereas the elements of the "serving system" would be dispersed throughout the geographical coverage area of the home network. Therefore, there is no disclosure or suggestion of the claimed arrangement for allowing a home operator to authenticate mobile user equipment in a serving mobile telecommunications network. There is no disclosure of passing a termination message generated by the mobile user equipment to the serving network, which message contains the value indicating that the serving network must obtain a further authentication vector from the home operator before allowing the user equipment to make further calls. There is no serving telecommunications network disclosed by Park. As a result, Park cannot satisfy the limitations of the pending claims.

Claims 2 and 3 are distinguished from the Park reference as a consequence of their dependence to claim 1. No reason in the Office Action is given for the rejection of claim 12. In any event, it is submitted that claim 12 clearly relates to patentable subject matter by virtue of its dependency to the novel and inventive subject matter of independent claim 8.

Claims 4 to 6, 9 to 11 and 14 to 16 were rejected as being unpatentable over Park and further in view of Harris. The Harris document (US Patent 6,442,406) is confined to the definition of a user interface that allows a user to set particular limits on calls. No mention is made of an authentication between mobile equipment and a serving network, with the equipment being disabled when a specified limit is reached. In view of this, it is suggested that the subject matter of the present invention would not have been obvious at the time the invention was made. Further, and in light of the above argument that the present invention is distinguished from that disclosed in the Park document, it is proposed that any combination of the Park and Harris disclosures would not lead to the present invention. Claims 4 to 6, 9 to 11 and 14 to 16 are therefore patentably distinguished from a combination of the Park and Harris disclosures.

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Claims 4 to 6, 9 to 11 and 14 to 16 were also rejected as being unpatentable over Park and further in view of Blanke. Upon review, and inasmuch as no basis is provided for rejection of claim 7, but paragraph 6 of the Office Action discusses claim 7, it appears that the examiner intended to refer to claim 7 only when citing the combination of the Park and Blanke documents. In view of the above argument that the present invention is distinguished from that disclosed in the Park document, however, it is submitted that a combination of the Park and Blanke disclosures would not lead to the present invention. Claim 7 is therefore patentably distinguished from a combination of the Park and Blanke disclosures.

Conclusion

The claims have been amended to place them in a format more consistent with U.S. patent practice and to eliminate multiple claim dependencies. No new matter has been added by way of these claim amendments. This applicant has further included a copy of the abstract on a separate sheet, eliminating reference numbers.

The application is considered to be in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

  
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